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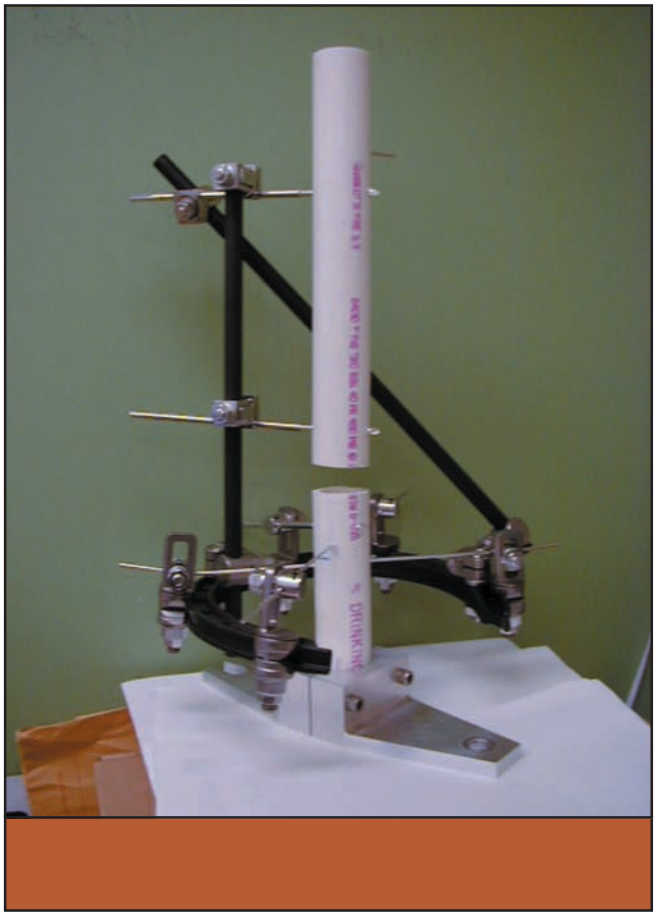
Success Story

SCIENTISTS GATHER TEST DATA FOR PROMISING BONE RESET TECHNOLOGY



Better medical treatment for critical bone injuries not only benefits soldiers, but the public in general. A device, referred to as an external fixator, relieves the inconvenience and unfavorable side effects of an inaccurate fracture reduction. The accuracy of the performance test data demonstrates the capabilities of the Materials and Manufacturing Directorate's Materials Test and Evaluation Team, who conducted the test.

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Accomplishment

In-house testing conducted at the directorate advances the development of a new medical device that stabilizes and orients broken bones. The Wright State University (WSU) School of Medicine, Department of Orthopedics at Miami Valley Hospital in Dayton, Ohio, designed and tested the device, which examines promising technology to improve the care of soldiers injured in battle and the general populace. As a result of this highly evolved method of treatment, recipients may recover more fully.

Background

Soldiers in battle experience bullet and shrapnel wounds, which sometimes result in bone fragments that are either lost or cannot be pieced together, making precise realignment of the bones extremely difficult, if not impossible. Attempting to realign the bones using a cast, plates, and screws can also prove inadequate. The general populace also suffers when broken bones cannot be properly aligned while mending.

Another unfortunate outcome, for soldier and citizen alike, is permanent reduced mobility, which can sometimes lead to early mortality. Directorate scientists and engineers provided in-house laboratory support to the WSU School of Medicine, Department of Orthopedics, at Miami Valley Hospital, and evaluated variations of a device developed to separate and precisely orient broken bones.

The external fixator is a series of wires, screws, and braces that orient fractured bones to heal in their original shape. The bones grow best with repeated and controlled axial loading with the avoidance of any side-to-side sliding at the fracture, which can keep the bones from unifying. The ideal external fixator allows limited axial flexing but not side-to-side shearing motion or rotational torsion.

The development of the final fixator configuration required evaluation and testing on simulated bones of initial deflections and the impact of loosening screws, as well as other critical procedures. The Materials Test and Evaluation Team's critical expertise can design, set up, and perform such a unique set of tests.

The Wright Technology Network, an organization funded in-part by the State of Ohio and established to promote technology transfer to the private sector, assisted WSU in arranging directorate testing on the fixators. WSU is working on additional testing of these devices, which could lead to further design improvements and technical refinements.

Materials and Manufacturing
Emerging Technologies
Technology Transfer

Additional information

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